Verizon VA's approach, which reflects *all* trench sharing Verizon VA has experienced over the three years for which data is available — for new developments and existing routes — provides the best measure of the amount of structure sharing that likely would exist going forward.

4. Verizon VA's Utilization Factors Are The Result of Efficient Network Operation, Are Forward-Looking, and Are a Proper Means of Ensuring That Verizon VA's Costs Are Recovered.

a) Verizon VA's Average Network Fill Factors are Forward-Looking.

In designing its cost studies, Verizon VA looked to its experience in operating the network in Virginia to determine the utilization (or "fill") factors expected to characterize each type of plant — that is, the percentage of its facilities that would be actively used in a forward-looking network to provide service to a paying customer, as compared to the total capacity in the network. These fill factors are used in Verizon VA's studies for the sole purpose of ensuring that the rates spread the forward-looking costs across only those units of capacity that will be available to produce revenue. Verizon VA does not use its utilization factors to size facilities in the cost studies or to otherwise plan the network, nor are the fill factors the product of any cable or equipment sizing algorithms in the cost studies. Rather, the fill factors used in Verizon VA's studies reflect the utilization levels that Verizon VA has observed in the Virginia network and expects to observe on a forward-looking basis.[103/] These fill factors reflect the amount of spare capacity that exists across the facilities in Verizon VA's network — amounts that have, on average, remained stable for a number of years, and are expected to remain stable in the future.

103/ In all but one case, Verizon VA determined that its actual utilization factors represented the best measure of forward-looking utilization. The one exception was RT plug-ins, for which Verizon VA assumed a forward-looking utilization rate that was higher than its actual rate.

Verizon VA therefore can predict with a reasonable degree of certainty the percentage of its network that would be available, on average, to produce revenue in the forward-looking network.

In an efficient local exchange network, there will, by necessity, always be a certain amount of spare capacity. Spare is needed for administrative purposes[104/] and to accommodate demand fluctuations and, in some cases, future growth.[105/] Additional spare also is the inevitable result of demand characteristics, network operation, and design.[106/] As a price-cap regulated company, Verizon VA has had and continues to have incentives to reduce spare in its network where doing so is efficient. However, there are competing concerns: the network must be engineered to meet service quality requirements, including the obligations imposed by the Virginia Commission, and operational demands. (VZ-VA Ex. 122 at 107-14.) The utilization levels in Verizon VA's network reflect Verizon VA's efforts to design and engineer the network in the manner that best balances these considerations. While those efforts may not be perfect, Petitioners' suggestion that the fill levels should be radically higher are implausible. If Verizon

104/ "Administrative spare" is necessary at each point in the network to permit efficient maintenance and administration of the network. (VZ-VA Ex. 107 at 35.)

105/ New capacity must be built in anticipation of demand and without any certainty about what level of demand will materialize. Verizon VA is required to have facilities available in advance of the specific need in order to meet its legal obligations to provide service to customers upon demand. (Tr. at 4112-13; VZ-VA Ex. 107 at 36; VZ-VA Ex. 122 at 113, 109-14.) Installing capacity in advance also reduces construction costs by permitting network growth in efficient capacity increments and at efficient time intervals. (VZ-VA Ex. 107 at 36-37.)

106/ For example, customer churn (*i.e.*, the inward and outward movement of customers) results in service being disconnected for some period of time when a customer moves out of a particular location until a new customer moves in. (VZ-VA Ex. 107 at 36.) The annual rate of churn ranges from 20% to 25% each year, and the duration of vacancies varies widely. (Tr. at 4102; VZ-VA Ex. 107 at 36.) The phenomenon of breakage (*i.e.*, that many network components are available only in discrete capacity sizes) also produces spare capacity. (VZ-VA Ex. 107 at 36.)

VA could operate efficiently at a higher average utilization and still provide continuous, quality service, it would have every incentive to do so. But recent trends in the Virginia market, which witnessed a sudden, unprecedented expansion in a previously quieter business area, and which subsequently has seen many businesses suddenly closing up shop, should drive home both the need for and causes of spare: growth and demand peaks can be unpredictable, and customers may suddenly disappear. The network must be designed to accommodate the former; the latter will leave some lines idle.

There is no reason that Verizon VA's utilization rates would or should increase in the forward-looking network. The forward-looking network simply will include a different mix of the same technology or plant that exists in the current network. Verizon VA has studied the utilization rates of each type of plant — *e.g.*, fiber feeder, copper feeder, distribution cable — and there is no reason to believe that the average utilization rate for any type of plant would change in the forward-looking network, even if the overall plant mix were to change. If anything, the competitive environment assumed under TELRIC should *decrease* average utilization as a result of increased fluctuations in demand and customer churn in the network. (*See* VZ-VA Ex. 107 at 39.)

And AT&T/WorldCom certainly have not produced any evidence that any network — today's or tomorrow's — could be operated efficiently with utilization rates as high as they propose. Even the MSM does not always use fills as high as those Petitioners propose for Verizon VA: Indeed, the MSM's distribution fill factor is only 52.5% — less than the 60% Petitioners insist must be used in Verizon VA's studies. (Tr. at 4514.) When Mr. Riolo was asked by the Commission if he was "aware of any network that achieves [AT&T/WorldCom's proposed] fills," he conceded that, while individual pockets of plant might do so, he could not pretend that he knew of any network in which such fills were achieved on average across the network. (Tr. at 4513-4515.) As Mr. Gansert testified, if an effort *were* made somehow to increase average fill across the network to the levels proposed by Petitioners, the result would be a loss of efficiency and a degradation of service. (Tr. at 4575.)

b) Spare Capacity in the Network Remains Constant on Average and Constitutes a Current Operating Network Cost.

AT&T/WorldCom's various arguments concerning whether Verizon VA has miscalculated or overstated the need for spare capacity in particular facilities are red herrings.[107/] The central attack on Verizon VA's fill factors, however, is Petitioners' claim that, even if Verizon VA's fill factors reflect the proper amount of spare in the network, CLECs should not pay for spare because they are not "using" it today. (AT&T/WCom Ex. 12 at 42-43; AT&T/WCom Ex. 11 at 32-33.) Their argument takes several forms, all turning on the concept that spare in the network is eventually "used up" by future growth and that today's customers should receive a credit for the revenue Verizon VA will receive in the future when current spare capacity is "used up" by future paying customers.

This argument is absurd. First, Petitioners introduced the notion that current ratepayers (or CLECs) pay the full costs of the facilities they use when they receive telephone service or a

---

107/ Petitioners argue, for example, that in calculating fill, Verizon VA should include as utilized cpacity not only "working lines" but connect-through and defective pairs, thus increasing utilization. They argue that this is how Verizon engineers consider utilization in practice when evaluating facilities. (AT&T/WCom Ex. 12 at 43-44.) Of course, at the same time, Petitioners recognize that "the costing exercise here is conceptually distinct from the task of an outside plant engineer." (AT&T/WCom Ex. 12 at 42.) Basic cost recovery principles dictate that Verizon VA can recover its costs only through *revenue generating units*. Because defective or idle (unassigned) units of capacity are obviously not revenue-generating, they should not be considered in the numerator when calculating utilization for cost study purposes. (VZ-VA Ex. 122 at 115-16.)

loop UNE, as well as the full costs of the additional spare that Petitioners contend is waiting to be "used up." Thus, Petitioners argue, if the utilization rate of a hypothetical facility were 50%, the customer who orders one unit on that facility would be paying for two. At some point, they argue, the customer accordingly should be entitled to one free unit of capacity in that facility. (*See, e.g.*, Tr. at 2935-36 ("I already paid for it . . . When do I get my free drop[?]").) In the alternative, Petitioners argue, the current customer's rates should be reduced, because a future customer will one day receive and pay for the facility that Petitioners contend the present customer is paying for today. (Tr. at 2935-36, 2996.)

The first flaw in this argument, and there are several, is that customers *never* pay for the full costs of the facility — or the unit of capacity on the facility — that is used to provide their service, much less the costs of the spare. As Dr. Shelanski explained, customers who obtain service — and CLECs who purchase UNEs — pay only the "incremental costs of " providing that unit of capacity in the facility *during the period that the customer receives service.* (Tr. at 2936.) The notion that after a few years of paying for service or a UNE, a customer or CLEC has paid the full costs of the underlying facility forevermore flies in the face of logic and ratemaking policy.

Furthermore, Petitioners seem to believe, incorrectly, that customers pay for specific facilities — either the one on which they are receiving service or the illusory spare facility for which Petitioners contend that they have paid. As Dr. Tardiff explained, customers and CLECs do not pay for any specific facility or share of a facility. Instead, they pay for a share of *capacity* on a network that is designed to operate efficiently, and which thus has the "spare capacity that allows Verizon to provide service at the least cost." (Tr. at 2937.) Or, as Mr. Gansert testified:

> You're paying for . . . [units] of capacity on the distribution system. You're paying for your share of the investment it takes to

> [AT&T/WorldCom's position] seemed to be that this capacity that you put in at the beginning . . . somehow gets used up over time. . . . The fact of running a network is that you don't see that, that capacity is not being used up. The spare capacity you put in today, . . . [i]f you look next year, you see the same amount. That's an efficient level. That is, in every period you see that in order to efficiently run the network, you have that much spare capacity for whatever reason. It could be for extra customers, it could be for administrative reasons, it could be . . the fact that customers come and go.

(Tr. at 2991-92.) Thus, spare capacity does not get "used up," and tomorrow's customers do not get a network consisting solely of today's spare capacity. In tomorrow's network, there should be the same average amount of spare, and thus the ratepayers of tomorrow, like the ratepayers of today, should shoulder the cost of carrying that efficient level of spare capacity during the time they receive service. (VZ-VA Ex. 122 at 106; VZ-VA Ex. 110 at 12-14.)

c) Each of the Facility-Specific Average Utilization Factors in Verizon VA's Studies is Accurate and Efficient.

As noted above, Verizon VA's expected fill factors generally are the product of the fills that Verizon VA has experienced running a real-world network. Different factors, such as breakage, churn, demand, and growth, drive the utilization of various facilities to various degrees. But in all cases, Verizon VA's utilization rates are the product of efficient engineering and balance the desire to maximize the use of plant with the competing goal of providing timely, high-quality service at a reasonable cost. Petitioners quibble with the utilization rates reported by Verizon VA, for every type of facility, suggesting incessantly that the utilization rates should be higher. In each case, AT&T/WorldCom steadfastly refuse to acknowledge that spare is needed for purposes other than accommodating growth or that breakage and churn impact levels of spare. But none of their arguments are supported by fact. Petitioners could not demonstrate that any real network could operate in the manner they prescribe, and in no case did they explain just how Verizon VA should or could adapt its engineering practices to achieve the proposed higher utilization levels without service degradation.

Petitioners focus in particular on Verizon VA's average **[VERIZON VA PROPRIETARY BEGIN]** **[VERIZON VA PROPRIETARY END]** fill for distribution, insisting that it should be 60%. Yet, as noted above, even the MSM distribution fill is not 60%, but 52.5%, suggesting that even Petitioners could not create a network with a 60% distribution fill. The value reported by Verizon VA reflects the reasonable amount of spare capacity necessary to serve Virginia demand efficiently while meeting the service quality standards imposed on Verizon VA. The primary factor in distribution utilization is not growth, but the need to accommodate subscribers' needs for multiple lines in a timely manner. (VZ-VA Ex. 122 at 114.) This is difficult because demand is unpredictable: the number of houses in a development may be fixed, but the number of lines that the residents of those houses will want at any given time is not predictable. (*See, e.g.*, Tr. at 4112-13.) As Mr. Gansert explained, in order to meet its regulatory obligations in Virginia, Verizon VA must build distribution facilities so that they are positioned in advance to serve potential demand that may develop in each living or business unit at any point in time; this concept of "ultimate demand" thus does not relate to pre-building for growth, but to building sufficient capacity to serve the varying potential demand at each customer location in a given area. (Tr. at 4116-17.)

Verizon VA follows the efficient practice of building distribution facilities with at least two pairs of distribution cables per subscriber "to avoid the prohibitive cost and delay associated with installing a new cable each time a group of subscribers on a particular street orders an above-average number of additional lines." (VZ-VA Ex. 107 at 115.) As Mr. Gansert explained, this practice "has been used in the entire LEC industry for almost 30 years and was based upon experience and studies that have been done over those years to determine the most efficient way to build" the distribution plant. (Tr. at 4203.) Verizon VA's average distribution utilization rates are due in large part[108/] to the difference between the efficient construction of two or more distribution pairs per subscriber and the actual average utilization in Virginia of 1.18 pairs per subscriber. (VZ-VA Ex. 107 at 115.) In addition, a variety of other factors specific to Verizon VA's provision of service to Virginia customers, (such as the need to satisfy service quality standards in Virginia and the effects of Virginia customer churn, contribute to Verizon VA's average distribution utilization rate. (VZ-VA Ex. 122 at 118-23.) As the Commission has recognized, fill factors prescribed for cost proceedings should account for such state-specific considerations.[109/]

AT&T/WorldCom have offered no evidence demonstrating that Verizon VA's existing distribution plant contains inefficient or unreasonable levels of spare capacity. Their only apparent attempt to do so consists of the naked, unsupported assertion that, "[u]nder scorched-node, for those areas where demand for additional lines has remained stable and is likely to remain so going forward, fewer spare facilities can be provisioned, resulting in more efficient use and higher utilization levels." (AT&T/WCom Ex. 12 at 47.) Apparently, Petitioners believe that the new, scorched node network could look at past demand served by the incumbent and be designed more tightly so as to serve just that amount of demand in just the locations where it exists today. The problem, of course, is that such a tightly designed new network could be defunct in a day, because past demand is a poor predictor of tomorrow's need at specific

---

108/ Verizon VA also adjusted its utilization rate for distribution by 10% to account for breakage. (VZ-VA Ex. 107 at 112-13.)

109/ *Massachusetts § 271 Order* at 9007 ¶ 39.

customer locations. There is no basis for assuming, for example, that the neighborhood in which customers have rarely ordered two lines will not suddenly sprout teenagers needing second lines for surfing the Internet.

Petitioners' critique of Verizon VA's **[VERIZON PROPRIETARY BEGIN] [VERIZON PROPRIETARY END]** utilization factor for fiber strand is equally without merit. Fiber strand utilization is driven primarily by breakage and the need for spare ribbons to perform rearrangements and maintenance. Most fiber cables are manufactured with the individual fiber strands sealed in groups of 12, called "ribbons." Because it is so much easier to work with whole ribbons than individual strands, it is more cost-effective to allocate and dedicate fiber by ribbon, even if this produces significant spare strand due to breakage. Thus, while a remote terminal may require only four strands, it is more efficient to dedicate the full ribbon and leave eight spare strands than to divide the ribbon into individual strands and resplice them individually to use at other sites. (VZ-VA Ex. 107 at 109.) In addition to breakage, fiber strand utilization is driven by the need to have spare fiber ribbons available for use when an individual ribbon fails in order to avoid service outages. (VZ-VA Ex. 122 at 131.)

AT&T/WorldCom's proposed fiber utilization factor of 100% fails to account for either of these primary drivers. In effect, AT&T/WorldCom assume "that you could build a perfectly sized and allocated fiber network in which every fiber was used . . . [with] no capability to ever provide any other service to any other person who wanted service." (Tr. at 4501-02 (Gansert).) In Mr. Gansert's words, this "just patently defies common sense." (Tr. at 4502.) Neither argument Petitioners mount to defend their position has any merit whatsoever. AT&T/WorldCom contend that both DSL and dark fiber services will consume the strands that Verizon VA has labeled "spare." (AT&T/WCom Ex. 12 at 52.) But this is simply not the case

— and even if either service drove utilization up, *neither* could have anywhere near a great enough impact to drive fiber strand utilization to 100%. Standard DSL is a copper-based technology that would have no impact on fiber strand utilization, and Verizon VA has no plans to offer fiber-based DSL services. (VZ-VA Ex. 122 at 132.) And Petitioners have offered nothing but speculation that they or other CLECs will increase their demand for dark fiber sufficiently to affect fiber strand utilization. (VZ-VA Ex. 122 at 133.)

Finally, Petitioners criticize Verizon VA's **[VERIZON PROPRIETARY BEGIN]** **[VERIZON PROPRIETARY END]** utilization factor for underground ducts. Given the relatively low incremental cost of installing an additional duct during the initial installation of a conduit section, the high cost of installing additional ducts at a later date, and the fact that municipalities typically discourage repeated excavations, "it is far more efficient and appropriate to install sufficient duct capacity at that time to accommodate the growth needs for the life of the plant than it is to repeatedly re-dig trenches every few years to install additional duct capacity." (VZ-VA Ex. 122 at 141-42.) Other factors, such as the need for spare ducts in case of a duct failure or flood, also counsel in favor of maintaining a sufficient amount of spare duct capacity. (VZ-VA Ex. 122 at 142.)

AT&T/WorldCom's criticisms of Verizon VA's duct utilization factor miss the point entirely. They attempt to minimize current costs by insisting that only one spare duct per conduit section should be installed, notwithstanding the fact, noted above, that the costs of installing additional ducts are minimal. Petitioners argue that spare ducts are unnecessary because Verizon VA has spare *cable*, or can increase fiber capacity if necessary by upgrading fiber electronics. (AT&T/WCom Ex. 12 at 72.) But the presence of spare cable capacity is not a substitute for spare conduit, because spare cable capacity in a failed or flooded duct cannot be used to restore service. The goal is to have a second duct available in which a backup cable can be installed and placed into service. (VZ-VA Ex. 122 at 142.) Nor is the ability to upgrade fiber capacity through additional electronics a substitute for spare conduit. Remote terminal capacity is not infinitely expandable, and SONET ring capacity cannot be upgraded (*e.g.*, from an OC3 ring to an OC12 ring) without taking the ring out of service.[110] (VZ-VA Ex. 122 at 142.)

5. Verizon's Cable And Remote Terminal Sizing Algorithms Produce Lower Per-Unit Costs.

As was repeatedly discussed at the hearing, Verizon VA does not use its utilization factors to size facilities used in its cost studies; it simply applies those factors to the costs of the facilities that are used in the studies. (Tr. at 4210 (Sanford).) While in theory, applying utilization to increase the size of the facility studied would have produced even lower unit costs, ultimately there is no valid concern that cable or remote terminal (RT) sizes used in Verizon VA's studies are understated. To the contrary, Verizon's cable pricing algorithms and its use of a 224-line RT as the smallest size RT are conservative and produce lower per-unit prices.

For distribution cable, Verizon assumed an average cable size in each distribution area equal to the number of working lines in the distribution area. This assumption conservatively overstates cable sizes because distribution cable typically must emerge from the serving area interface (SAI) in multiple directions, requiring multiple cables. (VZ-VA Ex. 122 at 99-100.) In addition, as the distribution cables branch out into the distribution area, they are tapered to

---

[110] It should be noted, in any event, that AT&T/WorldCom's proposed 64% reduction for Verizon VA's conduit investment does not even follow from their arguments concerning conduit utilization, but instead is the product of arbitrary calculations and adjustments. (*See* VZ-VA Ex. 122 at 143-144 and Attachment L.)

smaller cables. (VZ-VA Ex. 122 at 99-100.) Thus, the average cable size used in a distribution area will be considerably smaller than even the average cable size that emerges from the SAI and certainly smaller than the total number of working lines in the distribution area. Verizon VA's use of total working lines to size distribution cable therefore produced an understatement of forward-looking distribution cable investment.

For copper feeder cable, Verizon assumed a cable size equal to the typical copper feeder cable identified for each UAA in Verizon VA's engineering survey. This typical copper feeder cable size overstates the copper feeder cable size that would be used in the forward-looking TELRIC network, because the feeder cable sizes identified in the engineering survey reflected the then-existing network in which more than 80% of all lines were served using copper feeder. (VZ-VA Ex. 122 at 98.) In the forward-looking network that Verizon VA modeled for the studies, fewer than 18% of all lines would be served with copper feeder. (VZ-VA Ex. 122 at 98.) The significantly smaller number of copper-fed lines in the forward-looking network in turn would require smaller copper feeder cable sizes, but Verizon VA used the larger typical copper feeder cable sizes from its engineering survey. Because the larger sized cable is less expensive on a permit basis, this approach produces an understatement of forward-looking copper feeder cable investment.

When calculating RT investment, Verizon VA assumed a minimum RT size of 224 lines, rather than the smaller ones proposed by Petitioners. Verizon VA's loop cost model used the per-DS0 investment for the 224-line RT, which is *lower* than the per-DS0 investment for smaller RTs. And although Petitioners argue otherwise, this assumption does not decrease utilization in small distribution areas that do not need a 224-line RT; as explained above, utilization rates are *not* generated by the model or its other assumptions, but are average fills drawn from Verizon

VA's operational network. (Tr. at 4253.) The studies thus assume the cost of a 224-RT filled at normal, average utilization. (Tr. at 4467.) Consequently, in Verizon VA's cost model, "the larger the RT, the lower the cost per unit, and actually the lower the cost for the individual loop." (Tr. at 4253 (Sanford).) Thus, Verizon VA's use of 224-line RTs in small distribution areas *understates* UNE loop costs.

B. Interoffice Transport (IOF)

Verizon VA's methodology for calculating the costs of the interoffice transport (IOF) and entrance facilities UNEs assumes the use of a forward-looking, cost-minimizing SONET network configuration that is capable of serving Virginia demand. This approach is consistent with the approach that has been adopted in other state proceedings and reflects reasonable assumptions about IOF in a forward-looking network.

1. Description of the IOF Cost Model

For dedicated transport and entrance facilities,[111/] Verizon VA's IOF cost model uses a capacity costing approach similar to the one used in Verizon VA's loop cost model. The IOF cost model calculates a weighted average capacity cost for providing the transport UNEs over several representative, forward-looking SONET ring configurations. Verizon VA's approach is in contrast to the SONET network simulation approach that AT&T/WorldCom advocate in the MSM, which takes the challenge of being able to model all elements of a network to a new

---

111/ The dedicated interoffice transport element consists of transmission facilities that provide dedicated transmission between Verizon VA wire centers for a particular customer. Dedicated transport is offered between Verizon VA facilities at the DS1, DS3, STS-1, OC-3, and OC-12 signaling levels. Entrance facilities are dedicated transmission facilities that connect a CLEC central office or POP to a Verizon VA central office. Verizon VA offers entrance facilities with the same transmission capabilities as interoffice dedicated transport facilities. (VZ-VA Ex. 107 at 213-14.)

extreme. As Mr. Gansert pointed out, "[T]he problem of trying to estimate the cost or trying to build a model of an actual operating interoffice transport network that has several hundred nodes as Virginia does and has hundreds and even thousands of DS3s on a point to point basis, is computationally and practically impossible. No one has ever built such a model that works." (Tr. at 5626.)

Verizon VA's cost model has two components: (1) a fixed cost component that calculates the costs of electronics equipment (*e.g.*, add-drop multiplexers (ADMs) and digital cross-connect systems (DCSs)) at the Verizon wire centers, and (2) a per-mile component that calculates the mileage sensitive costs of the fiber, structure, and intermediate electronics between the wire centers. Verizon VA's fixed costs, which primarily consist of electronic equipment that are located at the nodes, do not vary by the length of the SONET ring. Conversely, per-mile costs by definition vary depending on the distance traveled. (VZ-VA Ex. 107 at 215.)

To develop fixed costs, Verizon VA derived its material investments from its own database or from current contract prices and information from Verizon VA's vendors and engineering organization, and adjusted as appropriate with investment loading factors. A utilization factor was then applied. After these steps were taken, the investments were applied to a number of different circuit designs and weighted according to frequency of use, producing an average circuit investment at the DS0 level. By multiplying the DS0-equivalent for a particular service by this average circuit investment value, Verizon VA calculated the appropriate level of investment for the service and then applied the annual cost factors.[112] (VZ-VA Ex. 107 at 216-221.)

To calculate per mile costs, Verizon VA used fiber cable investment data from its VRUC database and then converted mileage costs from actual route miles to air miles. (VZ-VA Ex. 107, Attachment B at 46.)

2. Verizon VA's IOF Cost Model Uses Forward-Looking Assumptions About SONET Ring Architecture.

Verizon VA based its cost calculations for the IOF electronics investment on several forward-looking assumptions. Verizon VA assumed that transport would be provided exclusively on all-fiber OC48 bi-directional line switched SONET rings. (VZ-VA Ex. 107 at 220; Tr. at 5628.) Verizon VA further assumed that the typical, forward-looking ring would have six nodes. This assumption reflects an appropriate, forward-looking balance between two options: with fewer nodes per SONET ring, it often is possible for a greater number of circuits (measured in DS3 equivalents) to enter and exit the ring. However, smaller rings typically require a greater number of costly interconnections (called intermediate channel terminations) to complete transport circuits, because it is less likely that both end points of a circuit will be located on the same ring. Intermediate channel terminations are a major cost in the SONET network due, among other things, to the need for additional ports per circuit, DCS equipment, and labor. (VZ-VA Ex. 122 at 150, 152-54.)

Conversely, SONET rings with more nodes generally require fewer interconnections and allow for enhanced growth-demand flexibility. (VZ-VA Ex. 122 at 151-52.) However, larger

[112] For entrance facilities, Verizon VA proposes a fixed monthly charge to recoup its forward-looking costs associated with providing CLECs access to those facilities, assessed using a similar methodology.

rings are more difficult to load without exhausting the fixed line capacity between adjacent nodes. As Mr. Gansert explained to the Commission, the group of Verizon experts and circuit design engineers that designed the model considered these competing concerns and concluded that "[t]he six node ring configuration was . . . the best representation of cost in an efficiently designed network." (Tr. at 5628.) The six nodes-per-ring assumption is the same one adopted in several state Section 252 proceedings.[113/]

The primary parameter necessary to calculate per mile costs is the typical length of a SONET ring. Mr. Gansert explained that, just as with the loop cost study, "[t]he distance element needs to be reflective of the local geography to some extent." (Tr. at 5628.) Verizon VA accordingly assumed that in the forward-looking network, the ring dimensions would mirror the dimensions of rings in the existing network, "since the same places have to be connected." (Tr. at 5629.) Because Verizon VA only maintains data on the average distance *between* nodes on its SONET rings (but not the average *total* ring length), Verizon VA calculated the average total ring length by multiplying the average distance between nodes by the average number of nodes per SONET ring. (VZ-VA Ex. 122 at 154-55.) For these purposes, Verizon VA used an average of 3.79 nodes per ring, a figure that understates the actual number of nodes per ring for all rings in Virginia because it does not include nodes located outside of Virginia on rings that cross the border into other jurisdictions (such as Washington, D.C. or suburban Maryland). (*See* VZ-VA Ex. 179.) Thus, the 3.79 nodes per ring assumption produces an estimate of the forward-looking average ring length that likely is understated.

113/ *See, e.g.*, Recommended Decision at 150; *In re Board's Review of UNE Rates, Terms and Conditions of Bell Atlantic New Jersey, Inc.*, Docket No. TO00060356, Summary Order of Approval (Dec. 17, 2001).

3. AT&T/WorldCom's Criticisms of Verizon's IOF Cost Model Are Without Merit.

AT&T/WorldCom originally alleged in their written testimony that they were unable to determine the basis for the assumption in Verizon VA's fixed cost calculations that SONET rings would have 16 ports per node, and suggested that Verizon VA had made a contorted miscalculation that failed to account for the requisite two ports per DS3 circuit on each ring. This criticism rang hollow at the time, given that Petitioners themselves acknowledged that Verizon had used the same IOF costing methodology in the New York UNE proceeding — in which Verizon already had responded to and refuted this same criticism.[114/] (*See* AT&T/WCom Ex. 12 at 128-29, 129 n.122.) Not surprisingly, after once again receiving Verizon VA's cogent explanation of its IOF calculations (VZ-VA Ex. 107 at 148-56), AT&T/WorldCom appear to have abandoned their attack, which was not even raised at the hearing.

Petitioners' remaining attack on Verizon VA's IOF cost model appears to be that not only the distance sensitive costs, but also the fixed cost calculations should have been based on the average number of nodes on Verizon VA's existing SONET rings because, as Mr. Turner testified, "you have to look at what is Verizon's current experience" to determine the forward-looking number of ports per node. (Tr. at 5630-5631; AT&T/WCom Ex. 12 at 128-29.) Of course, Verizon VA agrees with this contention: we have explained throughout these proceedings that the current network must be the starting place for any forward-looking assumption if that assumption is to have any value. And indeed, Verizon's engineers based their assumptions with respect to the forward-looking IOF network on their experience operating the

---

[114/] Indeed, New York is not the only state in which AT&T and/or WorldCom have raised this issue. As Mr. Gansert explained to the Commission, "the same issue has come up and been explained in detail in our testimony" in the other states where Verizon has filed its IOF model. (Tr. at 5630.)

existing network and serving IOF demand. Petitioners' insistence that the fixed costs of the forward-looking IOF network can simply be based on existing average node costs demonstrates a total absence of familiarity with IOF requirements and cost drivers and is significantly misguided.

First, while Petitioners appear to believe that smaller rings with few nodes are always more economical, this is simply not the case. As Verizon VA explained in its testimony, factors such as "the enhanced capabilities of the latest generation of SONET technology and operations" would make it economical to use larger rings than are used in the existing network. (VZ-VA Ex. 122 at 152.)

Second, AT&T/WorldCom's proposed input change entirely ignores the substantial costs associated with higher rates of SONET ring interconnection associated with such smaller rings. As Mr. Gansert explained at the hearing:

> [T]he model['s fixed cost inputs] need[] to be internally consistent. You cannot just change one parameter and not change the other. The model that was selected is a consistent estimate between the average load on the ring, the number of nodes, and the amount of interconnection between rings, all of which have a major effect on the cost of the network. So, you just can't—you just can't look at [the total number of ports] and say gee if you had to divide it by 3.79 instead of six.

(Tr. at 5633.) Rather, a change in the assumption concerning the number of nodes per ring would require an increase in the intermediate channel terminations input to reflect the greater number of ring interconnections that would be required for each circuit.[115/] (VZ-VZ Ex. 122 at 150-51.) Thus, AT&T/WorldCom's proposal to increase the number of ports per node in the

[115/] "[T]he smaller the rings clearly the more rings you are probably going to have to traverse to get from point to point." (Tr. at 5644; *see also* VZ-VA Ex. 122 at 150 ("Increasing the number of nodes on a SONET ring in turn increases the probability that a DS3 circuit can be created between two offices without having to use more than one ring.").)

fixed cost calculations without increasing the number of required interconnections would produce an understatement of forward-looking transport costs.

Third, as Mr. Gansert explained, the assumption of an average of 3.79 nodes per ring would not automatically result in an average *cost* across the network of a 3.79-node ring, given that there are so many variables that would affect the costs of any particular ring configuration: "The cost of two node rings versus eight node rings, it is not a linear relationship." (Tr. at 5632.) For these and other reasons, AT&T/WorldCom's arguments do not justify disregarding the judgment of Verizon's SONET engineering experts about the forward-looking configuration of the SONET network. And in the view of those experts, as Mr. Gansert testified, "the six node ring represented the best estimate in general of the cost of traversing SONET rings."[116/] (Tr. at 5632.)

Finally, AT&T/WorldCom also criticize Verizon VA's EF&I factor for transmission transport equipment, but here too their contentions are misplaced. The 53.2% in-place factor that Verizon VA uses in this proceeding was derived from its actual 1998 accounting data with its own network *in Virginia*. (VZ-VA Ex. 122 at 156-57.) In contrast, AT&T/WorldCom offer no substantiation for their argument that the proper EF&I should be "in the 30% range." (AT&T/WCom Ex. 12 at 138.) While AT&T/WorldCom attempt to make much of the fact that Verizon utilized a 36.4% in-place factor in the New York UNE proceeding, that figure was based on the specific mix of equipment installed in New York in that particular year, which is quite different from the equipment placed in Virginia in 1998. The former accounted for a larger

---

116/ Verizon VA employed appropriate common transport costs in its studies, which AT&T/WorldCom restate based only on their criticisms of Verizon VA's dedicated transport studies. For the reasons stated in this section, those criticisms are without merit, and Verizon VA's common transport rates accordingly are reasonable and well-supported in the record.

investment amount, leading to a smaller EF&I, that cannot simply be applied to the very different Virginia investment. (VZ-VA Ex. 122 at 158-59.)

C. Access To OSS Charges

AT&T/WorldCom have one primary criticism of Verizon VA's approach for recovering the costs of providing the Access to OSS UNE: in contrast to all other UNEs, Verizon VA should not be permitted to recover its costs from the CLECs that order and use the UNE.[117] This flies in the face of the law and basic cost recovery principles and would be manifestly unfair to Verizon VA. OSS costs should be recovered from those who have caused and will continue to cause Verizon to incur those costs — the CLECs. Moreover, although AT&T/WorldCom allege generally that Verizon VA did not support its Access to OSS costs, or may have double counted costs, they offer no evidence to support these challenges. In short, Petitioners have neither demonstrated any reason why Verizon VA should not be entitled to recover in full its costs of providing the Access to OSS UNE nor proposed any basis for recalculating Verizon's Access to OSS costs.

1. Access to OSS Costs Are Forward-Looking UNE Costs That Should Be Recovered from the CLECs.

In 1996, at the insistence of AT&T/WorldCom and other CLECs, the Commission explicitly defined Access to OSS as a UNE.[118] The Supreme Court upheld the Commission's

[117] Access to OSS issues are addressed in VZ-VA Ex. 107 at 242-97; VZ-VA Ex. 122 at 212-48, and VZ-VA Ex. 117 at 35-40.

[118] *See Local Competition Order* at 15763 ¶ 516 ("We conclude that operations support systems and the information they contain fall squarely within the definition of 'network element.'"); *see also id.* at 15752-15768; 47 U.S.C. § 153(a)(45).